

Off
said communications station having a plurality of intra-cavity phase conjugators arranged in an array.

Off
3. (Amended) The system of claim 1, wherein said communication station is configured to respond to said interrogating beam by encoding data into a phase conjugate beam in a plurality of semiconductor laser diodes and pumping the encoded phase conjugate beam by intracavity nondegenerate four wave mixing.

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10. (Amended) The system of claim 1, wherein the plurality of intra-cavity phase conjugators each comprise an aperture sufficient to resolve a substantial portion of the spatial components of the input wavefront of the interrogating beam.

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11. (Amended) The system of claim 1, wherein the plurality of intra-cavity phase conjugators each comprise an aperture sufficient to resolve greater than approximately 80% of the spatial components of the input wavefront of the interrogating beam.

Sub 2 18. (Amended) A system comprising:
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a transceiver constructed to transmit an interrogating beam; and
and
a communication station capable of receiving said interrogating beam;
said communication station having an intra-cavity phase conjugator with a top electrode, wherein an electrode is located in said top electrode.

Sub 3 22. (Amended) A system comprising:
Off
a transceiver constructed to transmit an interrogating beam;

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and
said communication station having an intra-cavity phase conjugator
which is a VCSEL structure.

Sub B
24. (Amended) An optical interconnection system comprising:
a fiber optic device constructed to transmit an interrogating beam; and
a micro-mirror adapted to receive said interrogating beam and transmit
the beam to a predetermined intra-cavity phase conjugator.

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25. (Amended) The system of claim 24, wherein said intra-cavity phase
conjugator is a VCSEL structure.

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34. (Amended) A system comprising:
a means for transmitting and receiving an interrogating beam;
a communication station operatively coupled to said transmitting and
receiving means and having a means for returning a phase conjugate beam to said
transmitting and receiving means.

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38. (Amended) The method of claim 36, wherein said interrogating beam
interacts with at least one pump beam operating in each of said phase conjugators in
a substantially parallel manner.

Sub B1
39. (Amended) The method of claim 36, wherein said interrogating beam
interacts with at least one pump beam operating in each of said phase conjugators in
a substantially transverse manner.

40. (Amended) A method comprising:

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transmitting an interrogating beam from a transceiver;
receiving said interrogating beam at an array of intra-cavity phase conjugators through apertures located in the top electrodes of the phase conjugators;
modulating data onto a phase conjugate beam; and
transmitting the phase conjugate beam to said transceiver.

41. (Amended) A method comprising:

transmitting an interrogating beam from a transceiver;
receiving said interrogating beam at an array of intra-cavity phase conjugators and resolving a substantial portion of the spatial components of the input wavefront of the interrogating beam;
modulating data onto a phase conjugate beam; and
transmitting the phase conjugate beam to said transceiver.

42. (Amended) A method of providing an optical interconnect comprising:

transmitting an interrogating beam from a fiber optic device;
receiving said interrogating beam at a micro-mirror across free space;
transmitting a second beam from said micro-mirror to a predetermined phase conjugator.

Please add claims 45-49 as follows:

45. (New) The system of claim 1, wherein said plurality of intra-cavity phase conjugators are arranged in a two dimensional array.

46. (New) The system of claim 1, wherein said plurality of intra-cavity phase conjugators includes:

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